The male Ancillary Appendages of European species of the Athalia Group of the Genus Melitaea. (With three plates.)

By W. G. SHELDON, F.E.S.

Who that has studied European or Palæarctic Rhopalocera has not wrestled more or less unsuccessfully with this group of species, so difficult, and in certain cases impossible, to determine with certainty from the wing markings. Even that most acute detector of minute specific differences, the late J. W. Tutt, confessed to the writer on one occasion his inability to make sure to what species certain specimens belonged, and he left the following record of his views at the time in *Ent. Record*, vol. xi., p. 228, "I do not know whether we have a lepidopterist in Britain, who is comfortably at home when considering *M. athalia*, *M. dictynna*, *M. parthenie*, and relatives. One might fairly divide the specimens obtained here (Pré St. Didier) into the larger, coarser *M. athalia*, and the smaller, neater looking *M. parthenie*, one suspects, however, that they have all hatched from the same batch of eggs, and one observes also that the dark *M. dictynna* occurs with some very ordinary looking *M. athalia* in the Val Ferrex."

Some years ago the lepidopterist of the National Hungarian Museum at Buda Pest, Dr. Antal Schmidt, asked me to name the museum series of the group, consisting of about two hundred examples. In this rather hopeless task I consulted the Rev. G. Wheeler, unquestionably the best authority on the *Melitaeae* in Britain. Mr. Wheeler, after carefully studying the series, admitted that there were specimens in it which he could not determine with certainty, because certain characteristics on which he relied in Swiss and French specimens did not exist in those from Hungary.

During the expedition which Mr. A. H. Jones and I made to the Basin of the Volga, in 1914, certain *Melitaeae* were met with, and to determine these with certainty preparations of the genitalia of the whole of the species in the *athalia*-group had to be made.

This task was undertaken by Mr. A. L. Rayward, and in view of the excellence of his preparations, and the fact that, so far as I am aware, photographs do not exist, in any British work, it seemed desirable that they should be reproduced and their chief characteristics briefly described.

It should be understood, however, that this paper deals only with the main outlines of the subject. It would require far more material than I could place at Mr. Rayward's disposal to make quite sure as to the exact value of certain points.

The appendages, for a group of which the wing markings of the various species so closely resemble each other, are extraordinarily diverse, and there is reason to believe that there is a good deal of minor variation between the local races of the species, and this may make any conclusions arrived at as to the specific value or otherwise of a local race or sub-species subject to revision, whenever preparations are made of the organs of a number of examples from each locality in which the species occurs.

The appendages in addition to being very diverse are highly developed, and this of course makes the sub-specific or local divergences more apparent than would be the case if they were simple. They are

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very dense organs, and in order to preserve their natural appearance Mr. Rayward has found it necessary to mount them in deep cells, to avoid flattening and consequent distortion. This method has the disadvantage that in photographing them the whole of the organs are not in focus in the same photograph. Consequently it has been necessary to photograph separately portions of the claspers of the majority of the species, as in these the chief differences of specific value exist. The whole of the preparations are mounted to show from the same viewpoint, *i.e.*, underneath.

The most remarkable feature in the organs of the group is that whereas two of the species, *M. athalia* and *M. parthenie*, have as an uncus a pair of pronounced spines, the others are without anything in the nature of a dorsal armature that would assist them in clasping the female. *M. parthenie* and *M. varia*, which until recently were considered to be forms of one species, are shown by the genitalia to be abundantly distinct, and *M. berisalensis* has important divergences from its parent species, *M. deione*, which seem to point to its distinctness as a species.

The aedoeagus, which is usually of much value in giving specific distinctions, is in this group somewhat uniform, and as the claspers alone are abundantly sufficient to determine the species, I have not dealt with any differences I have perceived in this organ. The saccus varies a good deal in shape in the different species, but so far as I have gone, it varies almost as much in individuals of the same species, and therefore it would be necessary before relying upon the variations of this organ to examine a great many more examples than I have done.

Only the most salient points of difference are called attention to in the following descriptions; for the lesser points study of the figures is necessary.

M. athalia.—The uncus consists of a pair of prominent spines which, in Pl. iii., fig. 1, can be seen behind the aedoeagus. The lower claw of clasper has a very distinct armature of serrations on the inner surface, which are shown in Pl. iii., figs. 1 and 2; the outer surface is smooth.

M. athalia var. *dictynnoides.*—This form, which was originally described in *Iris*, vol. xi., p. 2, by Hormuzaki, from specimens taken near Czernowitz, in the Bukovina, was considered by him to be a form of *M. aurelia*. Reference to Pl. iii., figs. 3 and 4, which are made from a specimen kindly handed to me by the Rev. G. Wheeler, who obtained it from Hormuzaki, and which was captured on Monte Cecina, near Czernowitz, shows that it is not that species, but a form of *M. athalia*.

In this sub-species the claw is somewhat more slender, and the servations more pronounced than is the case in typical *M. athalia*.

Unfortunately the preparation does not show this latter point to advantage.

M. parthenie.—In this species the uncus consists of a pair of spines similar to those obtaining in M. athalia; the claspers, however, are quite different in form from those of that species; in the upper claw the outer surface is smooth and the inner surface is serrated, whereas in the lower claw the inner surface is smooth and the outer surface has several not very pronounced serrations. See Pl. iii., figs. 5 and 6.

M. varia.—The striking difference between this and the last species includes the absence of the bifid prolongation of the uncus. The upper

claw of clasper in M. varia is bifid; the latter point is very striking, as will be seen by reference to Pl. iv., figs. 1 and 2.

M. deione.—Differs from M. athalia by the absence of the bifd prolongation of the uncus; the inner surface of the lower claw of clasper is serrated almost its whole length; the serrations are very uniform in size. See Pl. v., figs. 3 and 4.

M. berisalensis.—This species, or sub-species, differs somewhat unexpectedly and strikingly from its parent,* M. deione. The servations of inner surface of lower claws of clasper are more pronounced in M.berisalensis than in M. deione, and the teeth on upper claws are more numerous, and the clasper itself, as will be seen by Pl. iv., fig. 5, is much different in outline, being less produced to a point than is the case in M. deione.

These distinctions seem sufficient to constitute a species, but before definitely deciding the point it would be necessary to make preparations of a number of specimens of M. *berisalensis*, and also of M. *deione* from various localities, to ascertain if the differences are constant.

M. aurelia.—Entirely without the bifid prolongation of the uncus, differs also from M. athalia by the servations on the lower claw being fewer in number and not extending so far from the base. See Pl. v., figs. 1 and 2.

M. asteria.—This has the simplest appendages of any species of the group, therefore, as Mr. Wheeler suggests in the *Entomologist*, vol. xli., p. 177, it is probably the most ancestral. It is without prolongation of the uncus, and has only rudimentary servations on lower claw, but the upper claw has a pronounced tooth on outer edge. See Pl. v., figs. 3 and 4.

M. dictynna.—As the superficial markings of the wings would suggest, the appendages show this to be the most aberrant member of the group. The lower claw of clasper is without serrations, but the upper claw has a very remarkable spine, which is turned the reverse way to the direction of the claw itself. See Pl. v., fig. 5. M. dictynna var. britomartis.—A preparation of a specimen kindly

M. dictyma var. *britomartis.*—A preparation of a specimen kindly handed to me by Mr. A. H. Jones, and which was obtained by him at Reazzino, was made by Mr. Rayward. I am unable to find in it any points of difference from *M. dictyma* type.

EXPLANATION OF PLATES.

PLATE	IIIFig.	1.	Melitaea athalia, Buda Pest. \times 20.
	,,	2.	,, ,, lower claw. \times 75.
	,,	3.	Melitaea athalia var. dictynnoides, Czernowitz. $\times 20$
	37	4.	$,, ,, $ lower claw. \times 75.
	11	5.	Melitaea parthenie, Stalden. \times 20.
	,,	6.	,, ,, upper claw. \times 75.
PLATE	IV.—Fig.	1.	Melitaea varia, Abriès. \times 20.
	.,	2.	,, ,, upper claw. \times 75.
	,,	3.	Melitaea deione, Digne. \times 20.
	,,	4.	$,, ,, both claws. \times 60.$
	,,	5.	Melitaea berisalensis, Martigny. \times 20.
		6.	,, both claws. \times 60.
PLATE	VFig.	1.	Melitaea aurelia, Lugano. \times 20.
	,,	2.	,, ,, lower claw. \times 75.

* As a matter of Nomenclature one speaks of *M. deione* var. *berisalensis*, but phylogenetically *berisalensis* is the "parent" of *deione*. Distribution, the early stages and details of neuration alike point to this.—G.W.

Fig. 3. Melitaea asteria, Brenner Pass. \times 20.

PHOTOGRAPHS. — Plate III., figs. 1, 2, 4 and 6; Plate IV., figs. 2, 3 and 6; and Plate V., figs. 1, 2 and 4, are by Mr. F. Noad Clarke, and the remainder by Mr. E. M. Montgomery.

Notes on Entomology, etc., in England, 1916. By E. B. ASHBY, F.E.S.

The following notes were written this year, as occasion allowed me, in the neighbourhood of the camp at Fovant, Wilts, some eleven miles from Salisbury.

April 25th.—To-day has been the first entomological day as regards bright sunshine, and in close vicinity to the camp lines, I noticed for the first time this year a Pieris rapae, apparently just escaped from its pupa-case and slowly flying, as though not quite sure yet of its powers of flight, together with an Aglais urticae, hybernated of course, but vividly bright and fresh-looking, as it settled frequently quite close to me. I am trying to make a point of recording in these notes first dates of emergences of our butterflies, etc., this year throughout the entire season, in the hope that these points may be of interest in attracting entomologists to this neighbourhood, which bids fair to be a district full of rewards to the persistent worker, as it is just possible that this particular part of England has not been very much worked.

April 30th.-The day being fine and still, the males of Euchloë cardamines put in a first appearance, but from that day until May 17th continuous rain and dull weather prevented butterflies and many other insects appearing on the wing.

May 17th.-I observed at Tisbury, 41 miles from Fovant camp, the spring flight of *Celastrina argiolus*, together with the males of E. cardamines becoming common, and Pieris brassicae and P. rapae in abundance.

May 18th.-The sun being powerful to-day butterflies are becoming numerous, the spring brood of Pararge megaera is out, hybernated Aglais urticae and Vanessa io are dashing about in the hot sun, and the females of E. cardamines are emerging in perfect condition in the environs of Tisbury.

May 19th.—Another perfect entomological day. I walked up a stream leading from behind the vicarage at Tisbury to some fine woods about two miles distant. Along the stream Pieris napi, males and females in perfect condition, were flying in abundance, with many males of E. cardamines. On reaching the woods mentioned, which are private, I came across Hamearis lucina and Brenthis euphrosyne both just emerging on a small space, where a mass of blue bells and rhododendron blossom afforded a feast of colour for the eyes. These together with a few E. cardamines of both sexes and C. argiolus, were all the products of this particular spot in the above mentioned woods, which I find is termed "the valley" by the owners; but unless I am mistaken this locality and doubtless others in these woods bid fair to be a rich ground for butterflies as the season advances if the weather holds. I thought I saw one specimen of Leptosia sinapis this morning flying along the above mentioned stream, but as I failed to secure it I cannot be positive.